Kimley»Horn
of New York, P.C.

March 28, 2018

Mr. Bill Thompson
Stanford Bridge, LLC
50 South Buckhout Street
Irvington, NY 10533

Re: Traffic and Parking Analysis
Parking Lot Development, 50 South Buckhout Street
Irvington, Westchester County, New York

Dear Mr. Thompson:

Kimley-Horn of New York, P.C. ("Kimley-Horn") has prepared this study to identify parking needs and potential traffic impacts relative to the proposed addition of a parking lot to the existing office development at 50 South Buckhout Street in the Village of Irvington, Westchester County, New York. The subject parcel is located on the west side of South Buckhout Street, south of the existing building at 50 South Buckhout Street. This report has been prepared to address concerns expressed by the Village regarding the need for the parking lot and whether the additional parking will have an impact on traffic conditions on nearby streets and intersections.

To that end, parking surveys of the on-site parking lot and surrounding streets were conducted to identify the building's parking demand. Employee and visitor questionnaire surveys were also conducted to identify travel mode, parking locations and the number of drivers with building parking permits. Traffic counts were performed at key intersections and at the site driveways. Based on the parking surveys and driveway counts, estimates were made of the expected change in traffic volumes associated with the new parking lot and Synchro analyses were conducted to determine potential traffic impacts. A detailed description of the parking and traffic analyses is provided below.

Executive Summary

As can be seen from the appended supporting photographic data, parking surveys conducted in early January revealed that, except for handicapped parking, the 15-minute parking by the library and the 4 visitor spaces for the ConEd apartments, fewer than 30 of the 450 spaces on South Astor Street, on South Buckhout Street for 1,850 feet south of Main Street, or in the MTA lot on the east side of the tracks were available for someone to park in. It was only after travelling 1,850 feet down South Buckhout Street, past the crosswalk in the Middle of the Half Moon apartments, that parking became freely available. Anecdotally, it has been reported that January is not one of the busiest months for parking in the area.

Further, the property owner has issued 35 more permits to tenants than there are spaces to park in, not all tenants get a permit to park on-site and the parking surveys indicate that approximately 60 building employees or visitors park on the surrounding streets.

The provision of 44 new on-site parking spaces will allow up to 44 building tenant vehicles that are parked on the adjoining streets to be parked on-site, thereby freeing up parking on the streets for Village residents and visitors, potentially reducing the number of drivers circling the roadways in search of a parking space and preventing the migration of parking to Willow and Maple Streets during busier months or if parking demand at the building should increase.

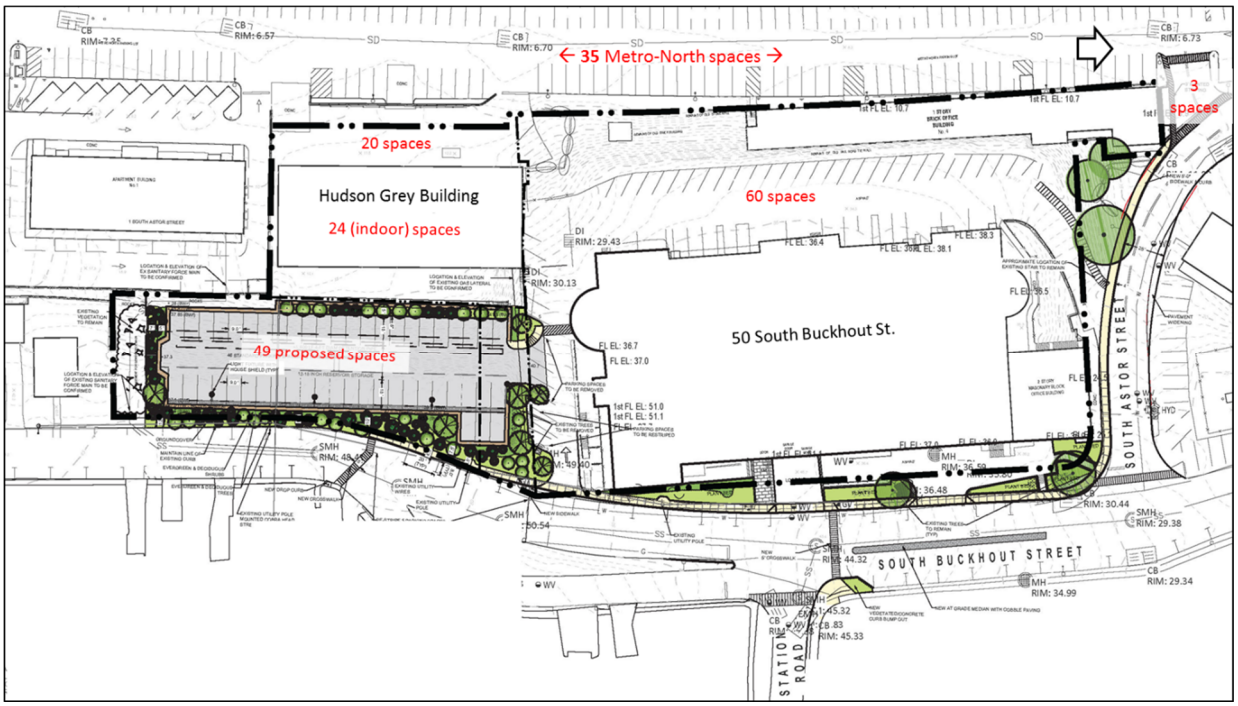
Traffic analyses of the South Buckhout Street intersections with Station Road and South Astor Street revealed that the relocation of on-street parkers to the new parking lot will not have an adverse impact on traffic operating conditions and that the intersections currently operate well within their capacity.

Project Description

The owner/operator of 50 South Buckhout Street would like to add a net 44 parking spaces to the existing 109 spaces currently provided at the property. The owner also rents 35 off-site spaces from Metro-North Railroad, for a combined total of 144 on-site and off-site spaces. Until recently, the owner had a total of 60 Metro-North spaces, however, 25 spaces were taken back by Metro-North in August of 2016. The proposed parking lot is to provide 49 spaces and the access to the lot will be provided via a connection to the site's entrance driveway (see figure below). To accommodate the proposed access to the parking lot, 5 existing parking spaces will be eliminated, resulting in a net increase of 44 spaces.

The addition of the parking lot is occasioned by the shortage of employee parking on-site as well as the recent revocation of 25 parking spaces by Metro-North. To meet the existing tenant's needs, the owner would like to provide additional on-site, permit parking to avoid the inconvenience of employees seeking parking off-site (and taking up on-street parking spaces that could be used by Village residents).

Proposed Plan



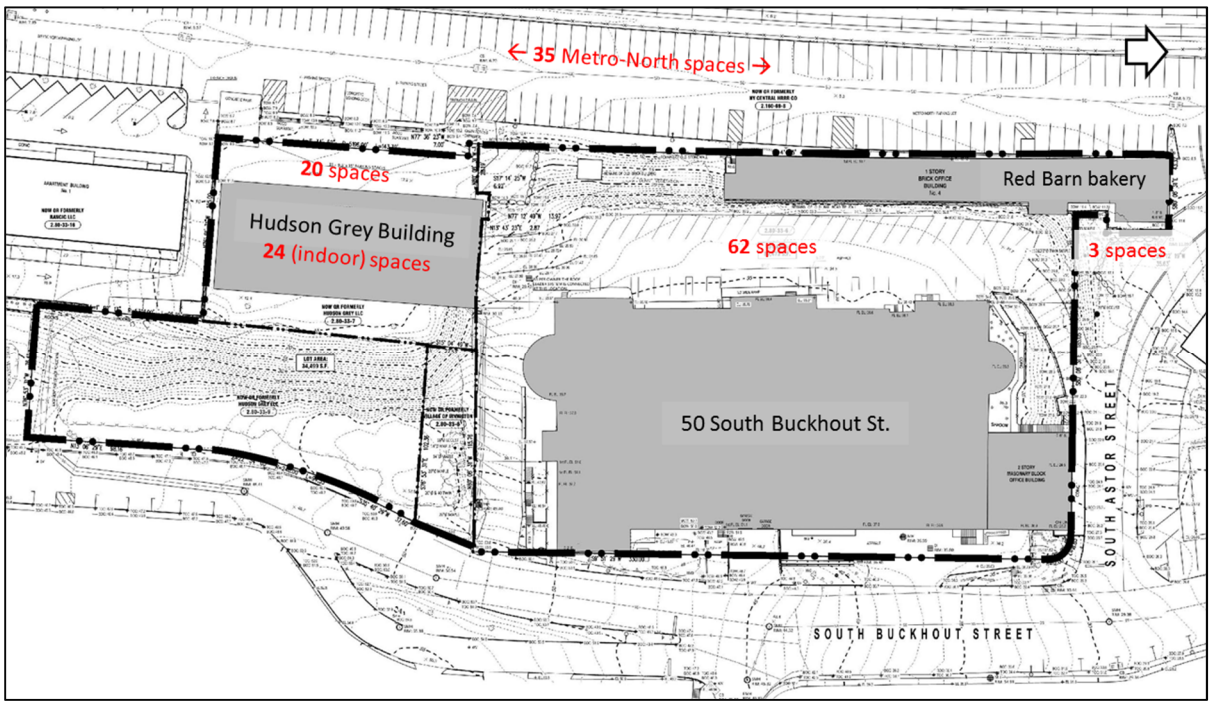
Parking Analysis

Existing Conditions

On-Site Parking Spaces

The 109 existing parking spaces at the property includes 62 spaces in the parking lot surrounding the Trent building at 50 South Buckhout Street, 3 spaces at the Red Barn Bakery, and 44 spaces in the Hudson Grey building. The Hudson Grey building has 24 spaces located on the second floor of the building with access via the Trent building parking lot, and 20 spaces in an outdoor lot on the west side of the building with access via the railroad parking area (see **Figure 1** below for parking locations).

Figure 1 – Parking Locations



Source: Existing survey prepared by Paul J. Petretti

With the exception of the 3 spaces at the Red Barn Bakery which are for customer parking (15-minute limit), only permit holders are permitted to park in the property's 109 parking spaces. As of December 2017, the building owner has issued the following permits:

- 95 permits to park in the 62 spaces surrounding the Trent building, which is 33 more than the number of vehicles that can be accommodated,
- 22 permits issued to park on the surface lot in front of the Hudson Grey building, 2 more than the number of vehicles that can be accommodated;
- 24 permits issued to park in the Hudson Grey building, the same as the number of vehicles that can be accommodated.

In addition, the building operator has issued 35 permits for Metro-North permit parking (LAZ) along the railroad to the west of the building.

As indicated above, although not every permit holder may be on site every day, there are 35 more parking permits issued than spaces available.

Parking Surveys

A parking inventory was conducted to identify the number and type of parking spaces on the streets within the study area. The on-street parking study area and number of spaces inventoried on each street are shown in **Table 1** below (also shown graphically on **Figure 2** in the Appendix**)**.

Table 1 - On-Street Study Area and Parking Inventory

Street/Parking Lot	From	To	Number of Spaces in Study Area
South Buckhout Street	Main Street	975 ft south of Station Rd	148 spaces
South Astor Street	Main Street	South Buckhout Street	28 spaces
Maple Street	Entire length		22 spaces
Willow Street	Station Road	225 ft south of Station Rd	14 spaces
Station Road	South Buckhout St.	700 feet east of So. Buckhout St	No parking
Metro-North Parking Lot (east of RR tracks)	Main Street	Southern end of Metro-North parking lot	256 spaces

Spaces consist of: permit (Village or Metro-North), meter, 6-hour, 2 hour, 15-minute, ADA, Village employee, visitor

To determine the property's existing peak parking demand and to identify the availability of parking spaces on the streets surrounding the site, Kimley-Horn conducted parking surveys on Tuesday January 16, 2018. The on-street parking surveys documented the number of vehicles parked in metered spaces, 2-hour and 6-hour limit spaces, permit spaces, village employee spaces, municipal spaces, visitor spaces and handicapped spaces.

The parking demand surveys indicated that the peak demand occurred at 1:00 p.m., with a total of 90 vehicles parked in the 109 on-site spaces. The peak parking demand for on-site and off-site parking is summarized in **Table 2**, below (the total parking universe within 700 feet of the site).

Table 2 – Parking Demand Summary

Parking area	Parking Demand	Inventory	Available Spaces
On-site Parking			
- at 50 So. Buckhout Street Lot	57	62	5
- Hudson Grey	30	44	14
- Red Barn Bakery	3	3	0
On-site Total	**90**	**109**	**19**
On-street Parking			
South Buckhout Street			
- 6-hour parking	107	122	15
- Municipal parking	10	13	3
- Village staff parking	13	13	0
Total So. Buckhout St	***130***	***148***	***18***
South Astor Street			
- Handicapped parking	0	2	2
- 15-minute parking	0	4	4
- 2-hour parking	14	17	3
- Village staff parking	5	5	0
Total South Astor St	***19***	***28***	***9***
Maple Street			
- 6-hour parking	**5**	**11**	**6**
Willow Street			
- 6-hour parking	**2**	**7**	**5**
Station Road			
No parking permitted	0	0	0
Metro-North Parking Lot			
- Permit parking	191	197	6
- Meter parking	48	48	0
- Handicapped parking	5	7	2
- Visitor parking	0	4	4
Total Metro-North Parking Lot	***244***	***256***	***12***
On-Street Total	**400**	**450**	**50**

Notes: Based on parking surveys taken on Tuesday 1/16/2018 with Hudson Grey internal parking survey conducted on Friday 1/26/2018.

As shown in **Table 2**, there were a total of 90 vehicles parked in the 109 on-site spaces. For the off-site (street) parking demand, 400 vehicles were parked in the 450 inventoried spaces in the study area. It is important to note that not all of the 450 on-street spaces would be appropriate for use by employees and visitors to the property as they are either for short-term parking (2-hours or less) or are restricted

to certain users (Village staff, handicapped, etc.). Table 3 provides a summary of **the building's effective parking** (parking that can be used by employees and visitors to the property) and the corresponding surveyed parking demand for those parking spaces.

Table 3 – Parking Demand Summary for Site Users

Parking area	Parking Demand	Inventory	Available Spaces
On-site Parking			
- at 50 So. Buckhout Street Lot	57	62	5
- Hudson Grey	30	44	14
- Red Barn Bakery	3	3	0
On-site Total	**90**	**109**	**19**
On-street Parking			
South Buckhout Street			
- 6-hour parking	107	122	15
- Municipal parking	N/A		
- Village staff parking			
Total So. Buckhout St	***107***	***122***	***15***
South Astor Street			
- Handicapped parking	N/A		
- 15-minute parking			
- 2-hour parking			
- Village staff parking			
Total South Astor St			
Maple Street			
- 6-hour parking	**5**	**11**	**6**
Willow Street			
- 6-hour parking	**2**	**7**	**5**
Station Road			
No parking permitted	0	0	0
Metro-North Parking Lot			
- Permit parking (1)	34	35	1
- Meter parking	48	48	0
- Handicapped parking	N/A		
- Visitor parking			
Total Metro-North Parking Lot	***82***	***83***	***1***
On-Street Total	**196**	**223**	**27**

Notes: Based on parking surveys taken on Tuesday 1/16/2018 (Hudson Grey building surveys taken on 1/26/2018).

(1) Building owner has 35 Metro-North parking permits. Permit parking use based on Metro-North permit parking to permit spaces ratio.

As shown in **Table 3**, there are 223 parking spaces on the neighboring streets that would be suitable for use by the property's employees and visitors. Of these 223 spaces (18 of which are on Willow and Maple Streets), the surveys indicated that there was a peak parking demand of 196 vehicles, leaving only 27 available spaces scattered throughout the study area (of which 40% were on Willow and Maple Streets).

Parking Questionnaire Surveys

In addition to the parking demand surveys, surveys were also conducted of employees and visitors to the 50 South Buckhout Street building on a weekday between 10:00 a.m. and 11:30 a.m. to determine the mode of travel (auto, walk, bike, carpool, taxi, train, etc.), parking location, and number of drivers using parking permits. There was a total of 139 respondents; 129 (or 93%) were employees and 10 (7%) were visitors. The survey results are summarized in **Table 4.**

Table 4 – Employee/Visitor Parking Survey

Mode of Travel								
Drove	Limo/car service	Train	Carpool	Walked	Uber/ Lyft	Bus	Taxi	Biked
62%	11%	10%	9%	4%	4%	0%	0%	0%
Parking Location								
On-site – 53%				**On-street – 47%**				
Permit holders		Non-permit holders		Permit holders		Non-permit holders		
90%		10%		8%		92%		

As shown in **Table 4**, 62 percent of the respondents drove to the site, 11 percent came by limo or car service, 10 percent arrived by train, 9 percent carpooled as a passenger, 4 percent walked and 4 percent used Uber. Of the respondents who drove, 53 percent parked on-site and 47 percent parked on the street. Permit holders comprised 90 percent of the on-site parkers and 8 percent of the on-street parkers. Of those who were not issued permits 92 percent (or approximately 60) parked on the street, with the remainder parking on-site without approval, in spaces that were available.

The parking counts and questionnaire surveys reveal that many of the building's employees and visitors who drive to the site are using on-street parking spaces as the availability of on-site parking is limited. If the 44 new parking spaces are approved, the property owner will be able to issue as many as 50 additional permits to tenants, thereby reducing the number of vehicles parked on the neighborhood streets.

Traffic Analysis

Existing Conditions

Kimley-Horn conducted weekday AM and PM peak-period traffic counts on Friday January 26, 2018 from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. at the following locations determined to be key to defining the project's potential traffic impacts:

- South Buckhout Street at Station Road;
- South Buckhout Street at South Astor Street.

Both of these intersections are unsignalized "T" intersections with one-lane in each direction. At the South Buckhout Street intersection with Station Road, STOP signs are provided on the South Astor Street approach and on the southbound South Buckhout Street approach. The northbound approach runs free-flow. Similarly, at the Station Road intersection with South Buckhout Street, STOP signs are provided facing the northbound South Buckhout Street and westbound Station Road approaches. Southbound South Buckhout Street runs free-flow.

The traffic counts were tabulated and the peak hours identified as occurring in the morning from 7:30 to 8:30 a.m. and in the afternoon from 5:00 to 6:00 p.m. The existing counted volumes were seasonally adjusted by increasing them by 15 percent and are shown on **Figure 3** in the Appendix.

To identify the existing trip generation rates for the building, Kimley-Horn also conducted weekday driveway traffic counts at the entrance to the property on South Buckhout Street and the exit from the property on South Astor Street from 8:00 a.m. to 6:00 p.m. The driveway counts are summarized in **Table 5**, below.

Table 5 - Driveway Volumes

Time of Day	Driveway Volumes
7:45-8:45 AM	**18**
8:45-9:45 AM	34
9:45-10:45 AM	18
10:45-11:45 AM	22
11:45 AM-12:45 PM	**38**
12:45-1:45 PM	19
1:45-2:45 PM	25
2:45-3:45 PM	23
3:45-4:45 PM	13
4:45-5:45 PM	**29**

As shown in **Table 5**, the driveway peak hour occurred at lunch time with 38 total vehicles entering or exiting the site. During the previously-identified peak roadway hours, the building generated 18 vehicles during the AM peak hour and 29 vehicles during the PM peak hour.

A trip generation rate was calculated using the driveway volumes counted during the AM and PM peak hours and dividing that number by the total parking spaces accessible from the entrance and exit driveways. A total of 80 parking spaces are accessed from the driveways (56 spaces on the west and south sides of the building and 24 indoor spaces in the Hudson Grey building). The calculated rates were further increased by a seasonal factor of 15 percent. The calculation resulted in a 0.26 trip rate

per parking space during the AM peak hour and a 0.42 trip rate per parking space during the PM peak hour.

Future Conditions

To determine future traffic operating conditions without the proposed parking lot, the existing traffic volumes were increased by the factors indicated below:

- 3 percent to account for background traffic growth expected to occur by the end of next year;
- Traffic from the proposed 27-unit condominium development at 30-40 South Broadway.

The above factors were applied to the existing volumes to develop the No-Build volumes (future traffic conditions without the proposed project). The No-Build volumes are shown in **Figure 4** in the Appendix.

To continue to meet the tenant's needs, the owner would like to provide additional permit parking to avoid the inconvenience of employees seeking parking off-site (and taking up on-street parking spaces that could be used by Village residents). To develop the future Build traffic volumes, the driveway volumes were increased by 4 percent to account for current unoccupied space at 50 South Buckhout Street, which resulted in an increase of 7 trips during the AM peak hour and 11 trips during the PM peak hour. Also, with the additional 44 on-site parking spaces, it is expected that drivers who currently park on the nearby streets will relocate to the new parking lot. To determine the number of trips that may relocate from on-street parking, the adjusted existing trip rates identified above (AM - 0.26 trips per parking space; PM – 0.42 trips per space) were applied to the 44-space net increase in parking. This resulted in 11 relocated trips during the AM peak hour and 18 relocated trips during the PM peak hour.

The net change in Project traffic (vacant space trips and relocated trips) was redistributed to the driveways and to the study intersections and are shown in **Figure 5** in the Appendix. The Project trips were then added to the No-Build volumes, resulting in the Build volumes which are shown on appended **Figure 6**.

Synchro Intersection Analyses

Synchro analyses were conducted at the South Buckhout Street intersections with Station Road and South Astor Street for the Existing, No-Build and Build traffic volumes to determine current and future traffic conditions with and without the proposed relocated traffic. For the study intersections, the Synchro analysis documents the results in terms of delay and levels of service (LOS) for the critical minor-street approach and the left turn from the major street. LOS "A" represents the best conditions and LOS "F" represents the worst. The analysis results are shown in Table 6 below.

Table 6 - Level of Service Summary

Intersection Approach	AM Peak Hour						PM Peak Hour					
	Existing		No-Build		Build		Existing		No-Build		Build	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
South Buckhout Street & Station Road												
NB TR	B	12.3	B	12.5	B	12.6	B	11.8	B	12.0	B	12.2
SB LT	A	3.8	A	3.8	A	3.7	A	3.7	A	3.7	A	3.9
WB LR	A	9.4	A	9.4	A	9.5	A	9.5	A	9.5	A	9.7
South Buckhout Street & South Astor Street												
NB LT	A	5.2	A	5.2	A	5.3	A	2.4	A	2.4	A	2.3
SB TR	B	12.7	B	13.0	B	13.1	B	11.5	B	11.7	B	11.9
EB LR	A	9.2	A	9.2	A	9.3	A	9.5	A	9.6	A	9.7

Note: Based on Synchro 10 software; delay is expressed in seconds per vehicle

As shown in the table, the analyses indicate that the minor street approaches at both intersections are currently operating at good levels of service (LOS "B" or better). In the future, under No-Build conditions, the intersection approaches will continue to operate at LOS "B" or better. Under Build conditions, with the relocation of traffic volumes from on-street parking to the new parking lot, the intersections will continue to operate at good levels of service with only imperceptible increases in delay of up to 0.2 seconds on some approaches.

Conclusion

The analyses indicate that the 50 South Buckhout Street building currently generates more parking than it provides. The proposed net increase of 44 on-site parking spaces will help to alleviate this shortfall and will prevent any future traffic from spilling further into the adjoining neighborhood. Furthermore, the new parking spaces will generate little, if any additional traffic, as they will merely be satisfying an existing need for motorists who currently park on the nearby streets. For the same reason, it is our opinion that the small amount of relocated traffic will not have an impact on roadways more remote from the site, such as Main Street and West Clinton Avenue by virtue that most of those who will use the additional on-site parking spaces currently pass through these intersections on their way to the building anyway.

Please contact me if you have any questions.

Very truly yours,

KIMLEY-HORN OF NEW YORK, P.C.

T. John Canning, P.E.

Appendix

Photos of Area Parking

Figures

Synchro Analysis Output Sheets

Kimley»Horn
of New York, P.C.

Photo Key Map

Photos taken on Tuesday January 16, 2018

Photo # 1 – Two-hour parking along South Astor Street (looking north)

Photo # 2 - 6-hour parking along South Buckhout St (looking south)

Photos taken on Tuesday January 16, 2018

Photo # 3 - 6-hour parking along South Buckhout Street looking south to crosswalk

Photo # 4 - 6-hour parking along South Buckhout St at north end (looking north)

Photos taken on Tuesday January 16, 2018

Photo # 5 - 6-hour parking and DPW parking along South Buckhout St (looking south)

Photo # 6 - 6-hour parking and DPW parking along South Buckhout St at South Astor St (looking north)

Photos taken on Tuesday January 16, 2018

Photo # 7 – South Buckhout Street, south of Station Road (looking north)

Photo # 8 – South Buckhout Street at South Astor Street, (looking south)

Photos taken on Tuesday January 16, 2018

Photo # 9 - Grey Building parking lot (west side of building)

Photo # 10 – Metered and permit parking in Metro-North Railroad lot (looking south)

Photos taken on Tuesday January 16, 2018

Photo # 11 – Metered and permit parking in Metro-North Railroad lot (south end)

Photo # 12 – Metered and permit parking in Metro-North Railroad lot (north end, looking south)

Photos taken on Tuesday January 16, 2018

Photo # 13 – Metered and permit parking in Metro-North Railroad lot (looking south)

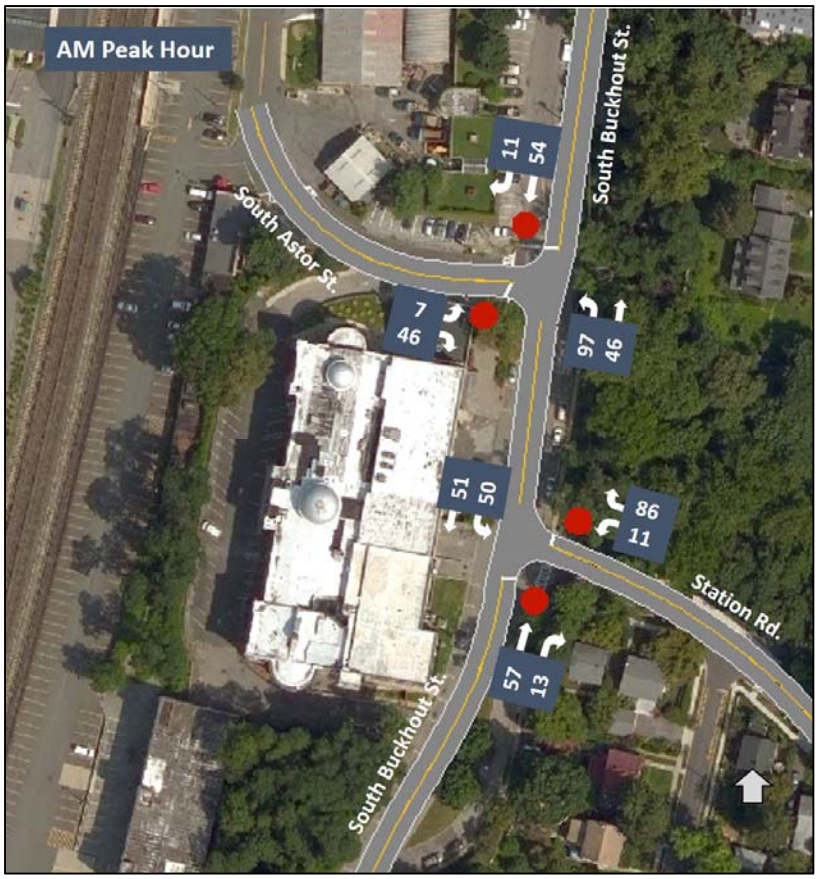
Photo # 14 – Parking lot at 50 South Buckhout Street (southern end of lot, looking west)

Kimley»Horn
of New York, P.C.

Figure 2
On-street Parking Survey Area

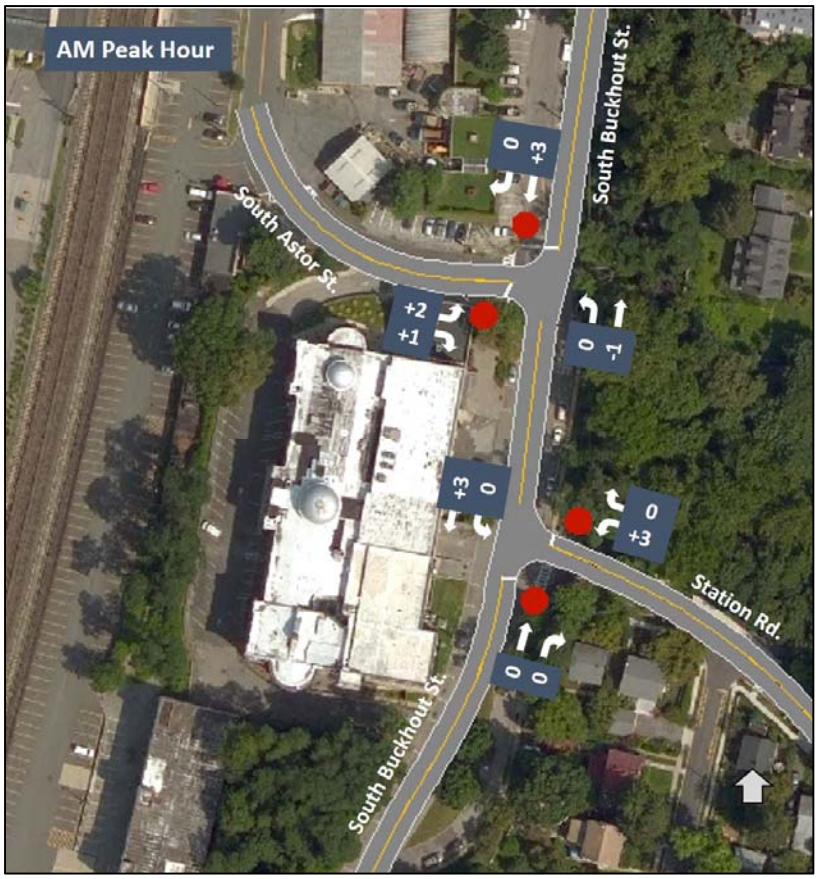
Kimley»Horn
of New York, P.C.

Figure 3
Existing Peak Hour Traffic Volumes



Kimley»Horn
of New York, P.C.

Figure 4
No-Build Peak Hour Traffic Volumes



Kimley»Horn
of New York, P.C.

Figure 5
Net Change in Project Trips

Kimley»Horn
of New York, P.C.

Figure 6
Build Peak Hour Traffic Volumes

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	55	13	10	83	48	49
Future Volume (Veh/h)	55	13	10	83	48	49
Sign Control		Stop	Stop		Free	
Grade		-1%	-1%		2%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	63	15	11	94	55	56
Pedestrians		16	23		23	
Lane Width (ft)		11.0	10.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		1	2		2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	276	177	205	46	23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276	177	205	46	23	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	89	98	98	90	96	
cM capacity (veh/h)	553	669	646	983	1563	

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	78	105	111
Volume Left	63	0	55
Volume Right	0	94	56
cSH	572	932	1563
Volume to Capacity	0.14	0.11	0.04
Queue Length 95th (ft)	12	9	3
Control Delay (s)	12.3	9.4	3.8
Lane LOS	B	A	A
Approach Delay (s)	12.3	9.4	3.8
Approach LOS	B	A	

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	7	45	53	10	93	45
Future Volume (Veh/h)	7	45	53	10	93	45
Sign Control	Stop			Stop	Free	
Grade	2%			0%	-1%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	56	65	12	115	56
Pedestrians	12			3	9	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			0	1	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	301	21	330	273	12	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	301	21	330	273	12	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	98	95	88	98	93	
cM capacity (veh/h)	559	1035	538	580	1589	

Direction, Lane #	NB 1	SB 1	NW 1
Volume Total	65	77	171
Volume Left	0	65	115
Volume Right	56	0	56
cSH	926	544	1589
Volume to Capacity	0.07	0.14	0.07
Queue Length 95th (ft)	6	12	6
Control Delay (s)	9.2	12.7	5.2
Lane LOS	A	B	A
Approach Delay (s)	9.2	12.7	5.2
Approach LOS	A	B	

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	47	18	10	32	62	68
Future Volume (Veh/h)	47	18	10	32	62	68
Sign Control		Stop	Stop		Free	
Grade		-1%	-1%		2%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	53	20	11	36	70	76
Pedestrians		22	22		22	
Lane Width (ft)		11.0	10.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	264	222	260	44	22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	222	260	44	22	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	91	97	98	96	96	
cM capacity (veh/h)	591	623	593	987	1566	

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	73	47	146
Volume Left	53	0	70
Volume Right	0	36	76
cSH	599	854	1566
Volume to Capacity	0.12	0.06	0.04
Queue Length 95th (ft)	10	4	4
Control Delay (s)	11.8	9.5	3.7
Lane LOS	B	A	A
Approach Delay (s)	11.8	9.5	3.7
Approach LOS	B	A	

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	22	79	51	3	25	54
Future Volume (Veh/h)	22	79	51	3	25	54
Sign Control	Stop			Stop	Free	
Grade	2%			0%	-1%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	26	92	59	3	29	63
Pedestrians	19			7	21	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	2			1	2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	147	40	222	116	19	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	147	40	222	116	19	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	96	91	90	100	98	
cM capacity (veh/h)	713	992	609	742	1569	

Direction, Lane #	NB 1	SB 1	NW 1
Volume Total	118	62	92
Volume Left	0	59	29
Volume Right	92	0	63
cSH	913	614	1569
Volume to Capacity	0.13	0.10	0.02
Queue Length 95th (ft)	11	8	1
Control Delay (s)	9.5	11.5	2.4
Lane LOS	A	B	A
Approach Delay (s)	9.5	11.5	2.4
Approach LOS	A	B	

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	57	13	11	86	50	51
Future Volume (Veh/h)	57	13	11	86	50	51
Sign Control		Stop	Stop		Free	
Grade		-1%	-1%		2%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	65	15	13	98	57	58
Pedestrians		16	23		23	
Lane Width (ft)		11.0	10.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		1	2		2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	286	182	211	46	23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	182	211	46	23	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	88	98	98	90	96	
cM capacity (veh/h)	540	664	640	983	1563	

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	80	111	115
Volume Left	65	0	57
Volume Right	0	98	58
cSH	560	925	1563
Volume to Capacity	0.14	0.12	0.04
Queue Length 95th (ft)	12	10	3
Control Delay (s)	12.5	9.4	3.8
Lane LOS	B	A	A
Approach Delay (s)	12.5	9.4	3.8
Approach LOS	B	A	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	7	46	54	11	97	46
Future Volume (Veh/h)	7	46	54	11	97	46
Sign Control	Stop			Stop	Free	
Grade	2%			0%	-1%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	57	67	14	120	57
Pedestrians	12			3	9	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			0	1	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	312	21	342	284	12	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312	21	342	284	12	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	98	94	87	98	92	
cM capacity (veh/h)	549	1035	526	570	1589	

Direction, Lane #	NB 1	SB 1	NW 1
Volume Total	66	81	177
Volume Left	0	67	120
Volume Right	57	0	57
cSH	924	533	1589
Volume to Capacity	0.07	0.15	0.08
Queue Length 95th (ft)	6	13	6
Control Delay (s)	9.2	13.0	5.2
Lane LOS	A	B	A
Approach Delay (s)	9.2	13.0	5.2
Approach LOS	A	B	

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	49	19	11	33	65	70
Future Volume (Veh/h)	49	19	11	33	65	70
Sign Control		Stop	Stop		Free	
Grade		-1%	-1%		2%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	55	21	12	37	73	79
Pedestrians		22	22		22	
Lane Width (ft)		11.0	10.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	272	230	269	44	22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272	230	269	44	22	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	91	97	98	96	95	
cM capacity (veh/h)	580	616	586	987	1566	

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	76	49	152
Volume Left	55	0	73
Volume Right	0	37	79
cSH	590	845	1566
Volume to Capacity	0.13	0.06	0.05
Queue Length 95th (ft)	11	5	4
Control Delay (s)	12.0	9.5	3.7
Lane LOS	B	A	A
Approach Delay (s)	12.0	9.5	3.7
Approach LOS	B	A	

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	23	83	52	4	26	56
Future Volume (Veh/h)	23	83	52	4	26	56
Sign Control	Stop			Stop	Free	
Grade	2%			0%	-1%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	27	97	60	5	30	65
Pedestrians	19			7	21	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	2			1	2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	151	40	231	118	19	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151	40	231	118	19	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	96	90	90	99	98	
cM capacity (veh/h)	708	992	597	738	1569	

Direction, Lane #	NB 1	SB 1	NW 1
Volume Total	124	65	95
Volume Left	0	60	30
Volume Right	97	0	65
cSH	913	606	1569
Volume to Capacity	0.14	0.11	0.02
Queue Length 95th (ft)	12	9	1
Control Delay (s)	9.6	11.7	2.4
Lane LOS	A	B	A
Approach Delay (s)	9.6	11.7	2.4
Approach LOS	A	B	

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	57	13	14	86	50	54
Future Volume (Veh/h)	57	13	14	86	50	54
Sign Control		Stop	Stop		Free	
Grade		-1%	-1%		2%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	65	15	16	98	57	61
Pedestrians		16	23		23	
Lane Width (ft)		11.0	10.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		1	2		2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	290	184	214	46	23	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	184	214	46	23	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	88	98	97	90	96	
cM capacity (veh/h)	536	663	638	983	1563	

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	80	114	118
Volume Left	65	0	57
Volume Right	0	98	61
cSH	556	913	1563
Volume to Capacity	0.14	0.12	0.04
Queue Length 95th (ft)	13	11	3
Control Delay (s)	12.6	9.5	3.7
Lane LOS	B	A	A
Approach Delay (s)	12.6	9.5	3.7
Approach LOS	B	A	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	9	47	57	11	97	45
Future Volume (Veh/h)	9	47	57	11	97	45
Sign Control	Stop			Stop	Free	
Grade	2%			0%	-1%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	11	58	70	14	120	56
Pedestrians	12			3	9	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			0	1	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	311	21	344	283	12	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	311	21	344	283	12	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	98	94	87	98	92	
cM capacity (veh/h)	550	1035	523	570	1589	

Direction, Lane #	NB 1	SB 1	NW 1
Volume Total	69	84	176
Volume Left	0	70	120
Volume Right	58	0	56
cSH	908	531	1589
Volume to Capacity	0.08	0.16	0.08
Queue Length 95th (ft)	6	14	6
Control Delay (s)	9.3	13.1	5.3
Lane LOS	A	B	A
Approach Delay (s)	9.3	13.1	5.3
Approach LOS	A	B	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	46	17	13	32	72	75
Future Volume (Veh/h)	46	17	13	32	72	75
Sign Control		Stop	Stop		Free	
Grade		-1%	-1%		2%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	52	19	15	36	81	84
Pedestrians		22	22		22	
Lane Width (ft)		11.0	10.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	292	248	290	44	22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	292	248	290	44	22	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	91	97	97	96	95	
cM capacity (veh/h)	560	598	567	987	1566	

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	71	51	165
Volume Left	52	0	81
Volume Right	0	36	84
cSH	570	810	1566
Volume to Capacity	0.12	0.06	0.05
Queue Length 95th (ft)	11	5	4
Control Delay (s)	12.2	9.7	3.9
Lane LOS	B	A	A
Approach Delay (s)	12.2	9.7	3.9
Approach LOS	B	A	

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	29	94	51	4	24	55
Future Volume (Veh/h)	29	94	51	4	24	55
Sign Control	Stop			Stop	Free	
Grade	2%			0%	-1%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	34	109	59	5	28	64
Pedestrians	19			7	21	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	2			1	2	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	146	40	242	114	19	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	146	40	242	114	19	
tC, single (s)	6.5	6.2	7.1	6.5	4.1	
tC, 2 stage (s)						
tF (s)	4.0	3.3	3.5	4.0	2.2	
p0 queue free %	95	89	90	99	98	
cM capacity (veh/h)	714	992	576	744	1569	

Direction, Lane #	NB 1	SB 1	NW 1
Volume Total	143	64	92
Volume Left	0	59	28
Volume Right	109	0	64
cSH	908	586	1569
Volume to Capacity	0.16	0.11	0.02
Queue Length 95th (ft)	14	9	1
Control Delay (s)	9.7	11.9	2.3
Lane LOS	A	B	A
Approach Delay (s)	9.7	11.9	2.3
Approach LOS	A	B	

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		